

# Software Product Description

**PRODUCT NAME:** DECnet-ULTRIX, Version 4.0 for RISC and VAX  
ULTRIX Network Software (End-node Only)

**SPD 26.83.08**

## DESCRIPTION

DECnet-ULTRIX, Version 4.0 is a Phase IV end-node implementation of Digital Network Architecture (DNA) for the ULTRIX Operating System and ULTRIX Worksystem Software (UWS) for VAX and RISC systems.

The DECnet-ULTRIX software enables communication among different networked Digital systems that use the DNA Phase III/IV\* protocols. At the same time, users and user programs can communicate with non-Digital systems that use the Internet (TCP/IP-based) protocols. DECnet-ULTRIX offers the following capabilities: task-to-task communications, network virtual terminal, remote file transfer, mail, coexistence with the Internet protocols (TCP/IP-based), and network-wide resource sharing and management as defined by the DNA protocols. DECnet-ULTRIX can communicate with and is warranted for use only with other Digital Phase III/IV\* DECnet products.

DECnet-ULTRIX allows ULTRIX users to access the resources of Phase IV DECnet networks. With proper network planning, DECnet-ULTRIX nodes can participate in DECnet networks with up to 1023 nodes per area and up to 63 areas per network. The DECnet-ULTRIX software enables communication among different, networked Digital systems that use the DNA Phase III/IV\* protocols. At the same time, users and user programs can communicate with non-Digital systems that use the TCP/IP protocols.

The network functions available to a DECnet-ULTRIX user depend, in part, on the configuration of the rest of the network. Each DECnet product offers its own functions and its own set of features to the user. Networks consisting entirely of DECnet-ULTRIX Phase IV nodes have all the functions described in this SPD. Networks that combine DECnet-ULTRIX nodes with other DECnet products may limit the functions available to the DECnet-ULTRIX user because some DECnet-ULTRIX features may not be supported by all DECnet products. Conversely, a user of another DECnet implementation will not necessarily have access to all DECnet-ULTRIX

functions. The DECnet products and functions available to users on mixed networks can be determined by comparison of the SPDs for the appropriate products.

Note that incoming connections from all Phase III systems to DECnet-ULTRIX systems are supported. Support for outgoing connections is limited to the following Phase III systems: DECnet-VAX and DECnet-RT. In addition, DECnet-ULTRIX only supports the connection of Phase IV routers/routing nodes on the point-to-point lines.

### *Phase IV End Node*

DECnet-ULTRIX is a Phase IV end-node only implementation of DNA and as such, can communicate directly with any other Phase IV node on the Ethernet or with any other Phase III/IV\* node in the network via a routing node on the same Ethernet or connected via point-to-point lines (either a dedicated DECnet Router Server, (SPD 30.34.xx) or a full-function VMS or RSX-11M/11M-PLUS system with routing capabilities). A Phase IV end node can communicate with any Phase III\* node in the same area. Communications with Phase II nodes is not supported.

DECnet-ULTRIX supports the downline load function for the following products for both VAX and RISC platforms:

- DECserver 100
- DECserver 200
- DECserver 300
- DECrouter 100
- DECrouter 2000
- Internet Portal
- X25router 100
- X25router 2000

DECnet-ULTRIX nodes cannot route messages on behalf of other nodes in the network. Since end nodes do not route messages, they do not need to store or update routing databases. Consequently, end nodes have less overhead than routing nodes.



### *DECnet and TCP/IP Coexistence*

DECnet-ULTRIX supports the coexistence of the DECnet and TCP/IP protocols. Coexistence means that DECnet and TCP/IP can run together simultaneously (DECnet-ULTRIX systems use DECnet to communicate with other Phase III/IV\* systems in DECnet networks and TCP/IP to communicate with non-Digital systems in Internet networks). DECnet and TCP/IP can also share the same system resources, such as the DEUNA and DEQNA Ethernet interfaces, and programs can be written in such a way that either of the lower-level protocols, NSP or TCP, is used. In general, existing programs running over TCP/IP can be easily modified to run with DECnet. Taking DECnet programs and having them run over TCP/IP can be done, but only if they do not make use of operations that are specific to DECnet.

### *Network Virtual Terminal*

DECnet-ULTRIX provides both incoming and outgoing heterogeneous remote terminal support (CTERM). This allows a terminal user on a DECnet-ULTRIX node to establish a logical connection to another DECnet-ULTRIX, DECnet-DOS, DECnet-VAX, or DECnet11M/11M-PLUS node. It also allows a terminal user on another DECnet-ULTRIX, DECnet-VAX, or a DECnet-11M/11M-PLUS node to establish a logical connection to a DECnet-ULTRIX node. This connection makes the terminal appear as if it were physically connected to the remote system and the user can use all the standard system and network utilities supported by that remote node. This capability is particularly useful for doing remote program development and allows the terminal users on smaller application-oriented systems to utilize the resources of other development-oriented systems.

### *Remote File Transfer*

The remote file transfer capability of DECnet-ULTRIX uses "dcp", the network file copy utility. DCP lets users transfer files between DECnet-ULTRIX nodes and other DECnet Phase III/IV\* nodes.

### *Network File Access*

Remote file access from other Digital systems is supported; user programs on other DECnet Phase III/IV\* systems can perform directory operations, as well as sequentially read, write, create, delete, and print files on a DECnet-ULTRIX system.

### *Mail*

The DECnet-ULTRIX software allows users to send and receive mail to and from users on other DECnet Phase III/IV\* systems. The DECnet-ULTRIX mail utility extends the existing ULTRIX mail system to include support for DECnet. Both the DECnet mail utility and the current ULTRIX mail systems share the same user interface. The syntax of the message address determines how the mail will be delivered. For example, to send mail from one DECnet system to another, the message address syntax is `nodename::username`.

### *Task-to-Task Communications*

Task-to-Task Communications allows cooperating programs running on any DECnet Phase III/IV\* node to exchange data. This is an extension of the socket level interface in the ULTRIX Operating System to include support for DECnet's session control and end-to-end communications (NSP) layers.

### *Network Management*

The Network Control Program (NCP) performs three primary functions:

- Displaying statistical and error information
- Controlling network components
- Testing network operation

These functions can be performed locally or executed at remote Phase III\* or Phase IV systems.

NCP allows the operator to display the status of DECnet activity at any Phase III\* or Phase IV node in the network. The operator can choose to display statistics related to the node itself, including traffic and error data, or examine data rates and error conditions in the Ethernet controller. The local operator can also perform a large number of operations to examine and control functions throughout the network.

DECnet-ULTRIX provides network event logging to a terminal device, disk file, or remote node. The NCP utility can be used to enable and disable the event logging facility as well as to optionally filter specific events.

NCP can also be used to test specific components of the network. NCP enables transmission and reception of test messages either between nodes or through controller loopback arrangements. The messages can then be compared for possible errors. NCP allows performance of a logical series of tests that will aid in isolating network problems.



### *DECnet-Internet Gateway*

A semi-transparent, bi-directional DECnet-Internet gateway is an integral part of the DECnet-ULTRIX software. This gateway, based on the TCP/IP in 4.3 BSD provides bidirectional network access between DECnet and Internet systems. It allows DECnet and Internet system users to communicate and cooperate through their respective file transfer, remote login, and mail capabilities. An Internet system user can use the FTP, TELNET, and SMTP protocols to communicate with a DECnet system user who uses the DAP, CTERM, MAIL-11 protocols and vice versa. In addition, the gateway does not require special software on systems that use its service, nor does it require accounts for remote users on the gateway system.

### *802.3 Compatibility*

DECnet-ULTRIX supports receipt of 802.3 packets and transmission of 802.3 packets via a programming interface.

### *DECnet-ULTRIX Configuration and Performance*

Configuring a DECnet-ULTRIX node to satisfy a user's application requirements involves making trade-offs of cost, performance, and functionality. The performance of a given DECnet-ULTRIX node depends not only on the expected network traffic and resultant processing, but also on the amount of concurrent local processing at that node. When configuring a DECnet-ULTRIX node, the following factors should be considered:

- CPU type
- Message size and frequency of transmission by all network applications
- "Local" applications

### *Communications Protocols*

DECnet-ULTRIX V4.0 supports two communications protocols: Ethernet, Version 2.0, and synchronous DDCMP (Digital Data Communications Message Protocol) for the data link and physical link layers. DECnet-ULTRIX V4.0 supports both full and half duplex point-to-point synchronous DDCMP lines as well as DMC compatibility mode for backwards compatibility with the DMC device.

DECnet-ULTRIX V4.0 for RISC only supports Ethernet, Version 2.0 communications protocol both at the data link and physical link layers.

The principal characteristics of the Ethernet physical layer are a signaling rate of 10 million bits per second, and a maximum station separation of 2.5 kilometers. Actual data rates will be substantially less than 10 million bits per second due to the limitations of the Ethernet controllers. The Ethernet data link layer is characterized by the channel access discipline known as the Carrier Sense Multiple-Access with Collision Detect (CSMA/CD).

### **HARDWARE REQUIREMENTS**

VAX, MicroVAX, VAXstation or Digital RISC system configurations as specified in the System Support Addendum (SSA 26.83.08-x).

### **OPTIONAL HARDWARE**

None

### **SOFTWARE REQUIREMENTS\***

For VAX, MicroVAX, DECstation 3100S, DECsystem 3100, DECsystem 5400/5810/5820 systems:

- ULTRIX Operating System
- DECnet-ULTRIX

For VAXstation, DECstation 2100 and DECstation 3100 Systems:

- ULTRIX Worksystem Software
- DECnet-ULTRIX
- \* Refer to the ULTRIX Optional Software Cross Reference Table (SPD 26.99.xx) or the System Support Addendum of this product for availability and required versions of prerequisite software (SSA 26.83.08-x).

### **ORDERING INFORMATION**

Software Licenses: QL-716A\*-\*\*

Software Media: QA-716A\*-\*\*

Software Documentation: QA-716AA-GZ

Software Product Services: QT-716A\*-\*\*

- \* Denotes variant fields. For additional information on available licenses, services and media refer to the appropriate price book.



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This layered product supports the ULTRIX License Management Facility.

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For more information on the License Management Facility, refer to the ULTRIX Software Product Description (SPD 26.40.xx), the ULTRIX Worksystem Software Software Product Description (SPD 28.22.xx) or the License Management Facility manual of the ULTRIX documentation set.

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